

Claims

1. A method for processing iron-laden spent sulfuric acid or iron-laden sulfuric acid materials obtained therefrom, in which the spent sulfuric acid or sulfuric acid material is reacted with a material that contains iron chloride and optionally other metal chlorides, whereby iron(II) sulfate is obtained.

2. The method according to Claim 1, characterized in that the hydrochloric acid generated in the reaction of the spent sulfuric acid with the metal chlorides is separated in gaseous form and/or in the form of aqueous hydrochloric acid and then utilized.

3. The method according to Claim 1, characterized in that the spent sulfuric acid derives from titanium dioxide production using the sulfate process.

4. The method according to Claim 1, characterized in that the spent sulfuric acid derives from the smelting of copper, lead or zinc.

5. The method according to Claim 1, characterized in that the spent sulfuric acid is a byproduct of an organic synthesis.

6. The method according to Claim 1, characterized in that the spent sulfuric acid is a pickling solution.

7. The method according to any one of the preceding claims, wherein the spent sulfuric acid has an  $\text{H}_2\text{SO}_4$  content of from 10 to 90 %.

8. The method according to Claim 7, characterized in that the sulfuric has an  $\text{H}_2\text{SO}_4$  content of from 20 to 30%.

9. The method according to any one of the preceding claims, characterized in that the iron chloride -containing material is in the form of a hydrochloric acid solution.

10. The method according to any one of the preceding claims, characterized in that the iron chloride-containing material contains 10 to 30 wt% iron ions.

11. The method according to any one of the preceding claims, characterized in that the concentration of iron ions in the spent sulfuric acid or in the iron containing material obtained from the spent sulfuric acid is in the range of from 20 to 22 wt%, preferably in the range of from 8 to 22 wt%.

12. The method according to any one of the preceding claims, characterized in that the iron chloride-containing material is a pickling solution or a product resulting from the processing of a pickling solution.

13. The method according to Claim 12, characterized in that the iron chloride-containing material is obtained by concentrating the pickling solution.

14. The method according to any one of Claims 1 to 11, characterized in that the iron chloride-containing material derives from the production of titanium dioxide using the chloride process.

15. The method according to Claim 14, characterized in that the iron chloride-containing material contains the iron-containing metal chlorides that are separated after the chlorination.

16. The method according to any one of Claims 1 to 11, characterized in that the iron chloride-containing material consists of the Cl-containing residues that are generated during the production of synthetic rutile from titanium- and iron-containing raw materials.

17. The method according to any one of the preceding claims, characterized in that either the iron chloride-containing material or the iron sulfate-containing material is reduced in acidity prior to the reaction with the other material, or the product of the reaction is reduced in acidity by adding metallic iron and/or iron oxides, and at the same time the concentration of iron is increased.

18. The method according to any one of the preceding claims, characterized in that the metal

sulfates other than iron sulfate that remain in the solution after crystallization of the iron sulfate are carried off for separate utilization or disposal.

19. The method according to Claim 18, characterized in that the metal sulfates other than iron sulfate are neutralized with Ca compounds.

20. The method according to any one of the preceding claims, characterized in that the iron sulfate-containing spent sulfuric acid or the products with iron chloride-containing materials obtained therefrom are simply transported from the place of their origin through a pipe to the place of the reaction.

21. The method according to any one of the preceding claims, characterized in that the concentration of iron ions in the spent sulfuric acid is 2 to 5 wt%.